CLAIMS

1. An organic-inorganic hybrid nanofiber characterized by comprising a crystalline polymer filament made of a polymer having a straight-chain polyethyleneimine skeleton, and a silica covering said crystalline polymer filament.

2. The organic-inorganic hybrid nanofiber according to Claim 1, wherein said polymer having the straight-chain polyethyleneimine skeleton is in the form of a line, a star, or a comb.

3. The organic-inorganic hybrid nanofiber according to Claim 1, wherein said polymer having the straight-chain polyethyleneimine skeleton is composed of a block copolymer between a straight-chain polyethyleneimine block and other blocks.

4. The organic-inorganic hybrid nanofiber according to Claim 1, wherein a proportion of the polyethyleneimine skeleton in said polymer having the straight-chain polyethyleneimine skeleton is not less than 25% by mol.

5. The organic-inorganic hybrid nanofiber according to Claim 1, wherein an amount of the silica included is in a range of from 30 to 90% by weight.

6. The organic-inorganic hybrid nanofiber according to Claim 1, wherein a diameter thereof is in a range of from 10 to 1,000 nm.

7. The organic-inorganic hybrid nanofiber according to Claim 1, wherein a diameter of said crystalline polymer filament is in a range of from 1 to 100 nm.

8. An organic-inorganic hybrid structure characterized in that the hybrid structure is formed by mutually aggregating the organic-inorganic hybrid nanofibers according to any one of Claims 1 to 7 by means of aggregation of the crystalline polymer filaments themselves in said organic-inorganic hybrid nanofiber.

9. The organic-inorganic hybrid structure according to Claim 8, wherein said crystalline polymer filaments themselves are crosslinked by means of a crosslinker.

10. A method for producing an organic-inorganic hybrid nanofiber characterized by comprising the steps of

(1) obtaining a crystalline polymer filament of a polymer having a straight-chain polyethyleneimine skeleton by dissolving the polymer having the straight-chain polyethyleneimine skeleton in a solvent, followed by precipitation in the presence of water, and

(2) covering said crystalline polymer filament with a silica by contacting said crystalline polymer filament with an alkoxysilane in the presence of water.

11. The method for producing an organic-inorganic hybrid nanofiber according to Claim 10, wherein said alkoxysilane is an alkoxysilane having 3 or more valences.

12. The method for producing an organic-inorganic hybrid nanofiber according to Claim 10, wherein in said step (2), an amount of the alkoxysilane to be contacted with the crystalline polymer filament is in a range of from 2 to 1,000 times with respect to one equivalent of an ethyleneimine unit of the polymer having the straight-chain polyethyleneimine skeleton for forming the crystalline polymer filament.

13. A method for producing an organic-inorganic

hybrid structure characterized by comprising the steps of

(1') obtaining a crystalline polymer filament of a polymer having a straight-chain polyethyleneimine skeleton and at the same time, obtaining a hydrogel formed from said crystalline polymer filament, by dissolving the polymer having the straight-chain polyethyleneimine skeleton in a solvent, followed by precipitation in the presence of water, and

(2') covering the crystalline polymer filament in said hydrogel with a silica by contacting the hydrogel formed from said crystalline polymer filament with an alkoxysilane in the presence of water.

14. The method for producing an organic-inorganic hybrid structure according to Claim 13, wherein after said step (1'), said hydrogel is crosslinked by means of a crosslinker.

15. The method for producing an organic-inorganic hybrid structure according to Claim 13 or 14, wherein said alkoxysilane is an alkoxysilane having 3 or more valences.

16. The method for producing an organic-inorganic hybrid structure according to Claim 13, wherein in said step (2'), an amount of the alkoxysilane to be contacted with said hydrogel is in a range of from 2 to 1,000 times with respect to one equivalent of an ethyleneimine unit of the polymer having the straight-chain polyethyleneimine skeleton for forming the crystalline polymer filament in said hydrogel.